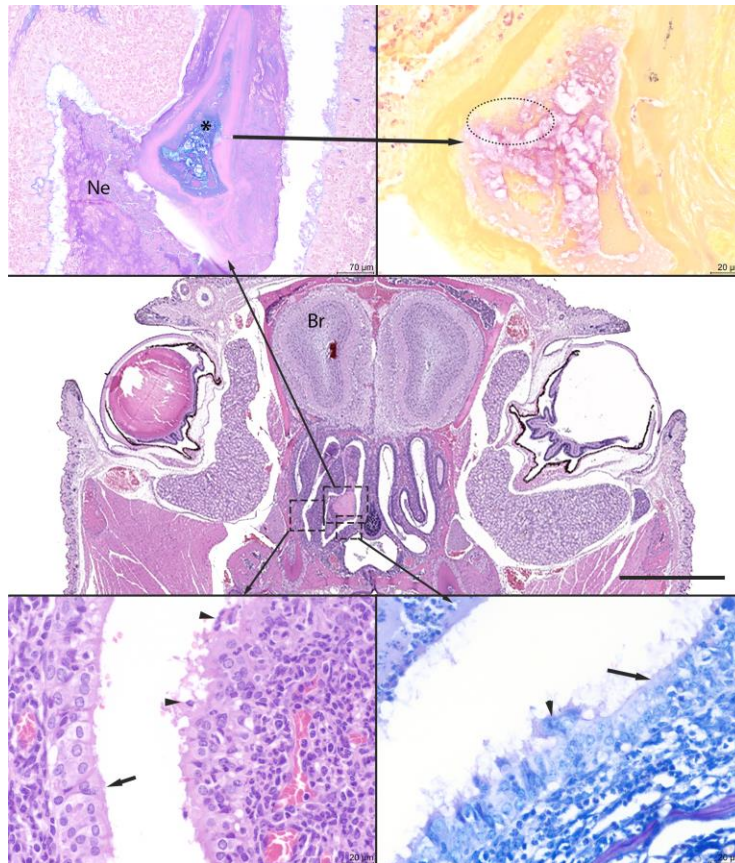
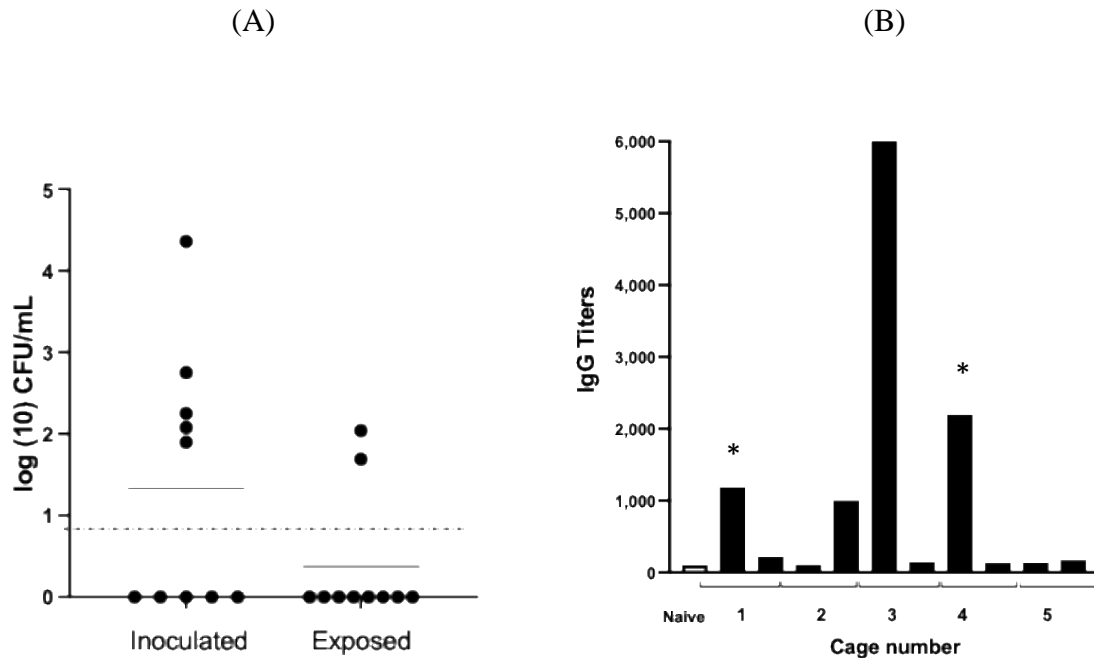


**Fig. S1.** Average serum anti-*B. pertussis* IgG titers from groups of C3H/HeJ mice inoculated intranasally with a high dose ( $10^7$  CFU/5 $\mu$ L PBS) of *B. pertussis* (blue line) or left uninfected (red line). (n=4 per group)



**Fig. S2. Histopathology of *B. pertussis* day 7 post infection**

**Center panel:** Representative images from the *B. pertussis* challenged mice obtained from stained whole-slide scanned images of coronal section of the nose at the level of the eyes and olfactory bulb of the brain (Br). HE stain. Scale bar = 2 mm. Dashed rectangles and arrows illustrate higher magnification of affected areas. **Top left:** image illustrates a mucopurulent exudate within the nasal meatus (asterisk, \*). The exudate has a mixture of neutrophils (Ne) arranged about proteinaceous (pink/purple) and mucous material (blue) in the center. Periodic Acid Schiff-Alcian Blue stain. Scale bar = 70  $\mu$ m. **Top right:** image, the dashed ellipse illustrates a cluster or colony of gram-negative bacteria within the mucous-rich exudate. **Bottom left:** the long arrow points to ciliated epithelia, and the arrowhead points to sloughed cells lining the nasal turbinate. HE stain. Scale bar = 20  $\mu$ m. **Bottom right:** the long arrow points to epithelia with loss of cilia, and the arrow head points to sloughed ciliated cells lining the nasal turbinate. Giemsa stain. Scale bar = 20  $\mu$ m.



**Fig. S3. Transmission of *B. pertussis* among adult mice.** **A.)** Filled circles on graph represent the number of *B. pertussis* CFUs recovered from the nasal cavities of individual mice that had been inoculated with *B. pertussis* (“Inoculated”) or co-housed with inoculated mice (“Exposed”) for 28 days (2 inoculated + 2 naïve; n = 5 cages). The horizontal bar indicates the mean, the dashed line indicates the level of detection. **B.)** Seropositivity of anti *B. pertussis* IgG in exposed mice. The graph shows the relative titers of anti- *B. pertussis* IgG antibodies detected in individual sera of 10 exposed mice co-housed in 5 cages (2 mice per cage) for 28 days with mice inoculated via catarrhal model.

**Table S1. Primers (Integrated DNA Technologies, United States), used in study to evaluate catarrhal stage expression of targeted genes.**

1. Glyceraldehyde-3-phosphate dehydrogenase GAPDH Forward: 5'-TCACCATGGAGAAGGC-3' GAPDH Reverse: 5'-GCTAAGTTGGTGGTGCA-3'
2. Mucin Muc1 F: 5'-GATCTCTAGCATCAAGTTC-3' Muc1 R: 5'-CTCATTCACITTTGACTTCT-3 Muc4 F: 5'-GATACTCCAAGTTCATAAC-3' Muc4 R: 5'-CAGGAGTTGTTCTTTG-3' Muc5a F: 5'-CTATCAAGGCTGCTTATTT-3' Muc5a R: 5'-GCTGGTATACTTGGTTATC-3'
3. Complement C3 C3 F: 5'-AGGAATTCAACTCAGATAAG-3' C3 R: 5'-CAGTGAAGATCCGATATAAG-3'
4. Chitinase 3-like-1 Chil 1 F: 5'-CTGATCAAGGAACTGAATG-3' Chil 1 R: 5'-CGTAGGTCATGAGATTGATA-3'

**Table S2. Histopathology scores of mice inoculated either with, [1] a high dose ( $3-4 \times 10^7$  CFU/5 $\mu$ L PBS) of *B. pertussis*, [2] three treatments of 10 $\mu$ L gentamicin (45 $\mu$ g) 8 hours apart and inoculated after 12 hours with  $3-4 \times 10^7$  CFU/5 $\mu$ L PBS, [3] 5  $\mu$ L PBS only, or [4] Antibiotic (gentamicin 45 $\mu$ /10uL) only. Sev –severity; Dist - distribution**

Date of Necropsy	Strain	Group	DPI	Mouse ID	Histo #	Nose Levels 1-4			Nose Levels 1-4			Nose Levels 1-4		Brain - olfactory bulb	
						Inflammation			Hyaline globules			Biofilm	Mucus	Inflammation	
						Sev	Dist		Sev	Dist				Sev	Dist
12/24/2018	1 (PBS + B. pertussis)	7	1	R19-630	3	3		0	0		yes	yes	2	2	
			2	R19-631	3	3		0	0		yes	yes	2	1	
			3	R19-632	3	3		0	0		yes	yes	2	1	
			4	R19-633	3	3		0	0		yes	yes	2	2	
	2 (Gentamicin + B. pertussis)	7	5	R19-634	3	3		0	0		yes	yes	2	1	
			6	R19-635	3	3		0	0		yes	yes	1	1	
			7	R19-636	3	3		0	0		yes	yes	1	1	
			8	R19-637	3	3		0	0		yes	yes	1	1	
	3 (PBS)	7	9	R19-638	0	0		0	0		yes	no	0	0	
			10	R19-639	0	0		0	0		yes	no	0	0	
	4 (Gentamicin)	7	11	R19-640	0	0		0	0		yes	no	0	0	
			12	R19-641	0	0		0	0		yes	no	0	0	
DPI = DAYS POST INFECTION															
HISTOPATHOLOGIC SCORES WERE ASSIGNED AS GRADES 0 (NO SIGNIFICANT HISTOPATHOLOGICAL ALTERATIONS); 1 (MINIMAL); 2 (MILD); 3 (MODERATE); SPECIFIED OR 4 (SEVERE) BASED ON AN INCREASING EXTENT AND/OR COMPLEXITY OF CHANGE, UNLESS OTHERWISE SPECIFIED															
DISTRIBUTION SCORING KEY: 1 - FOCAL; 2 - MULTIFOCAL; 3 - DIFFUSE															
SCORED BY/DATE: Uriel Blas-Machado DVM, PhD, DACVP 27Feb2019															

**Table S3. Differential gene expression in nasal cavity tissue from mice during infection with *Bordetella bronchiseptica*.** Table depicts 11 genes exhibiting changes over time in expression levels (log<sub>2</sub> fold change) over time in the nasal cavities of mice inoculated with *B. bronchiseptica*. The analysis reveals induction of a strong innate immune response starting as early as 3-days postinfection lasting throughout the time course to day 21. mRNA transcripts of *B. pertussis Chil-1*, *Cd177*, *C3* and *muc* gene homolog were analyzed in this study.

Gene	Symbol	Function	log <sub>2</sub> (fold change) at day p.i.			
			3	7	14	21
Chitinase-like 1	<i>Chil1</i>	Th2 inflammatory response, antimicrobial	2.67	2.46	2.86	2.73
CD177	<i>Cd177</i>	Neutrophil degranulation	2.48	2.65	3.10	2.61
Complement Component C3	<i>C3</i>	Activation of the Complement system	1.67	1.30	2.00	1.93
Ceruloplasmin	<i>Cp</i>	Iron homeostasis	1.38	1.25	1.59	1.30
Regenerating islet-derived 3 gamma	<i>Reg3g</i>	Secretion of bactericidal C-type lectin	1.10	1.25	1.66	1.46
TNF $\alpha$ induced protein 2	<i>Tnfaip2</i>	Inflammation mediator	1.32	1.36	2.27	1.91
Interferon induced transmembrane protein	<i>Ifitm1</i>	IFN-induced antiviral protein	1.27	1.40	1.38	1.56
Mucin 1	<i>Muc1</i>	O-linked glycosylation of mucins	1.31	1.11	1.33	1.22
Mucin 4	<i>Muc4</i>	O-linked glycosylation of mucins	1.33	1.27	2.02	1.64
Mucin 5	<i>Muc5ac</i>	O-linked glycosylation of mucins	1.68	2.43	3.53	3.18
Polymeric immunoglobulin receptor	<i>Pigr</i>	Immunoglobulin transcytosis	1.12	1.13	2.33	2.27